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AUTHOR Crook, Shirley J.
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ABSTRACT

This booklet provides guidelines for updating secondary school trade and industrial education teachers in the technologies of their teaching areas. The first part of the guide gives suggestions for organizing a staff development program. Next, specific programs that might be used are described, including the following: work experience internships; university and college course work; workshops, conferences, and seminars; industry observation; education and industry staff exchange; part-time employment; local programs; nonlocal programs; and industry training and updating programs. For each type of program, a description is provided, followed by administrative characteristics and a list of advantages and disadvantages. (KC)

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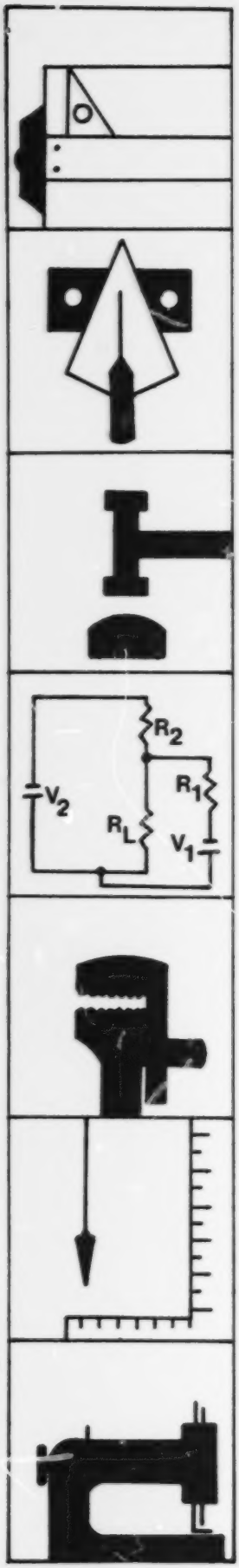

STAFF DEVELOPMENT GUIDELINES FOR TRADE & INDUSTRIAL EDUCATION TEACHERS

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OFFICE OF VOCATIONAL EDUCATION
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STAFF DEVELOPMENT GUIDELINES FOR TRADE AND INDUSTRIAL EDUCATION TEACHERS

Prepared by
Shirley J. Crook

Ancillary Services Section
Vocational Teacher Education Programs Unit
Office of Vocational Education
Dr. Moody Oswald, Director

Division of Instruction
Sidney B. Cooper
Deputy Superintendent

South Carolina Department of Education
Dr. Charlie G. Williams
State Superintendent

Columbia, South Carolina

July, 1986

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1. **Updating Teachers for Tomorrow's Technology—A Strategy for Action;** and

2. **Updating Teachers for Tomorrow's Technology—Programs and Practices.**

INTRODUCTION

This booklet provides guidelines for updating secondary school Trade and Industrial Education teachers in the technologies of their teaching areas. The first part of the guide gives suggestions for organizing a staff development program. Following this, specific programs are given that might be utilized. The information should be useful to vocational educators who are responsible for the task of keeping secondary school Trade and Industrial Education teachers abreast of today's rapidly changing technology: local schools, institutions, vocational directors or district administrators; teacher educators; vocational professional development leaders; State Department of Education personnel; and any others concerned with the design or implementation of programs to provide technological updating to Trade and Industrial Education teachers.

Should there be questions related to any information in the booklet they should be addressed to Teacher Education Consultant, Room 917, Rutledge Building, Columbia, South Carolina 29201; telephone: 734-8433.

The South Carolina Department of Education does not discriminate on the basis of race, creed, national origin, sex, age, or handicapping condition.

THE NEED FOR TECHNOLOGICAL UPDATING

In order to provide high quality Trade and Industrial Education programs during this period of rapidly changing technology it is imperative that secondary school Trade and Industrial Education teachers remain up-to-date in the knowledge and skills of their occupational fields. The challenge of keeping teachers' technical knowledge and skills current has traditionally been a concern in vocational education. In recent years this concern has increased greatly. Changes in the technology of the workplace have led to a situation that many vocational educators believe to be critical. While technological change is occuring in the workplace at unparalleled rates, the amount of time that the average Trade and Industrial Education teacher has been in the profession--and hence, away from the workplace--is increasing.

The need for updating Trade and Industrial Education teachers has been identified and addressed in the South Carolina Education Improvement Act (EIA). The regulation states:

> **Beginning with the 1987-1988 school year, all local school districts shall have established in concert with local businesses and industries or appropriate institutions of higher learning a staff development training program designed to update all trade and industrial education teachers in their occupational area.**

Not only has the need been identified, but with this regulation in the EIA, now it must be addressed.

In line with this thinking, regulations that mandate teachers to be recertified every five years require that three of the six recertification credits must be earned in the content area of certification. Therefore, the prudent vocational administrator and teacher would be wise to combine a staff development program for updating technological skills with the requirement to earn three recertification credits in content area. Such a joint effort would be benefical to the teacher in retaining certification and at the same time provide an incentive to participate in a program for technical skill updating.

HIGH QUALITY STAFF DEVELOPMENT
FOR
VOCATIONAL TEACHERS AND ADMINISTRATORS
RESULTS IN
HIGH QUALITY VOCATIONAL EDUCATION FOR STUDENTS

IMPLEMENTING TECHNOLOGICAL UPDATING

Before any upgrading of the technical skills of Trade and Industrial Education teachers can take place, a plan of action must be developed. A well developed plan is essential. The planning process should include input from the local Vocational Advisory Council. Endorsement of the final plan by the Council will enhance its success. The plan should address five major components:

(1) Identify the person responsible for coordinating the updating
(2) Identify the purpose and the need for the updating
(3) Select the method of obtaining the updating
(4) Implement the updating plans
(5) Evaluate the implementation of the plan.

Each of these five components is essential to the updating process. Taken together, they constitute a structure for the overall process of updating technical skills that is highly useful. A closer look at each of the five components will reveal how they apply specifically to the process.

IDENTIFY THE PERSON RESPONSIBLE FOR COORDINATING THE UPDATING

Each school district must develop a staff development training program designed to update Trade and Industrial Education teachers in their occupational area. To accomplish this goal, one person in each district should be assigned this responsibility. That person must be given the time to coordinate the program. This will have a direct influence on the quality of the programs offered.

Time should be made available for each teacher to contribute ideas on the type of training or inservice programs that would be the most beneficial. Also, time should be built into the planning process for the teachers to work directly with businesses and industries to identify what types of new technologies are taking place in their specific vocational area. Remember, teachers know what is currently taught in their classrooms. They are logical ones to help investigate the state-of-the-art in their subject area and to assist in analyzing what should or should not be taught in their course.

IDENTIFY THE PURPOSE AND NEED OF THE UPDATING

The purpose of updating the technical skills of Trade and Industrial Education teachers has been identified in the EIA regulation. According to the regulation, a staff development training program must be designed for the acquisition of technical (as opposed to pedagogical) knowledge and skills needed by teachers, which they will use to prepare students for current demands in the world of work.

Once the purpose of the updating is known, the next step is to identify the specific technical training needs of each Trade and Industrial Education teacher. No program will be successful if attempts to deliver it are perceived by teachers as

being not needed--that is, not relevant. To ensure that the program offered is needed and relevant, the updating process must take into account the following:

- The state-of-the-art in the different technological areas
- Levels of worker competence required by employers
- Teachers' current state of knowledge and skills
- Specific areas in which teachers need updating.

All too often programs for updating vocational teachers have been planned on the basis of what is available instead of what is needed. Teachers who participate in such activities are usually quick to voice their dissatisfaction with them and with future activities planned as part of the same program. Sitting through an eight-hour workshop on a topic not relevant to one's individual need is much more likely to discourage further participation than to encourage it.

When identifying the state-of-the-art in technologies, specific information must be gathered on the processes, operations, machinery, and equipment in use in the workplace. Also needed is specific information on the level of competence needed by beginning workers to function in a particular technological setting. There may be considerable differences between the state-of-the-art of the technology in the workplace and the level of beginning employee competence needed by employers. Teachers need to know how to prepare students for the specific requirements they will encounter.

The difference between the knowledge and skills that teachers actually have and those required in the world of work reveals to program planners staff development needs. The level of competence that employers require of beginning workers is a precise indicator of the actual knowledge and skills that teachers need to possess. It is important to note that information on both the state-of-the-art and level of employee competence must ultimately come from one source-employers in business and industry.

SELECT THE METHOD OF OBTAINING THE UPDATING

After a person has been identified to plan and direct the staff development program, and the specific needs of each teacher have been determined, selecting the method of obtaining the updating should be considered. First of all, sources for updating must be identified. One obvious place to look for these is in local businesses and industries. Work sites and contact persons can be identified that can provide teachers with the experience they need in current technology. Industry resource persons available to offer workshops or other events away from the workplace could be identified. Other sources for updating to be found in business and industry might be printed or audiovisual instructional materials. Local universities and colleges may have personnel or instructional materials that could serve as sources of updating, also.

After sources for updating have been identified, activities must be planned that will link teachers with these sources. A delivery technique must be chosen for each activity envisioned; arrangements must be made for implementing that technique; questions of location, cost, number of participants, and specific content to be covered must be settled. Furthermore, if a system for recertification or staff development credits is used, credit values must be assigned to the particular activities planned. A similiar procedure must be followed if college or university credits are to be awarded for participation in updating activities. If activities are planned and implemented by agencies that do not award such credits (e.g., a state division of vocational education, local board of education or board of trustees, or a professional teachers organization), then that agency needs to work out cooperative arrangements with a college or university to award credit.

A review of the literature, the perceptions of selected qualified observers, and reports of vocational education institutions and agencies have led to the identification of nine promising approaches to technological updating of Trade and Industrial Education teachers. Six of these approaches are specific delivery techniques: work experience internships; university and college course work; workshops, conferences, and seminars; industry observation; education and industry staff exchange; and part-time employment. The other three approaches are types of updating programs: local programs; non-local programs; and industry programs. These nine approaches will be described later in this document. Some advantages and disadvantages of each approach will be discussed.

IMPLEMENT THE UPDATING PLANS

Implementing the staff development program is the next step to be undertaken. In this very important step teachers participate in activities that have been identified as relevant to individual needs. Upon completion of activities, the results of updating--new technical knowledge and skills--are then incorporated into program curricula as appropriate.

In many respects, the simplest step in the entire process for updating technical skills is the implementation phase. Teachers participate in the activities that have been planned. At this point, the administrative and logistical details will have been arranged. The plan that was developed is simply implemented. However, the final phase of plan implementation could be a stumbling block, since incorporating the results of updating activities into program curricula is sometimes a real challenge. Skills and knowledge gained as the result of staff development must be incorporated into programs, however. It would be pointless for teachers to put time and effort into acquiring up-to-date knowledge and skills and then keep them secret.

EVALUATE THE IMPLEMENTATION OF THE PLAN

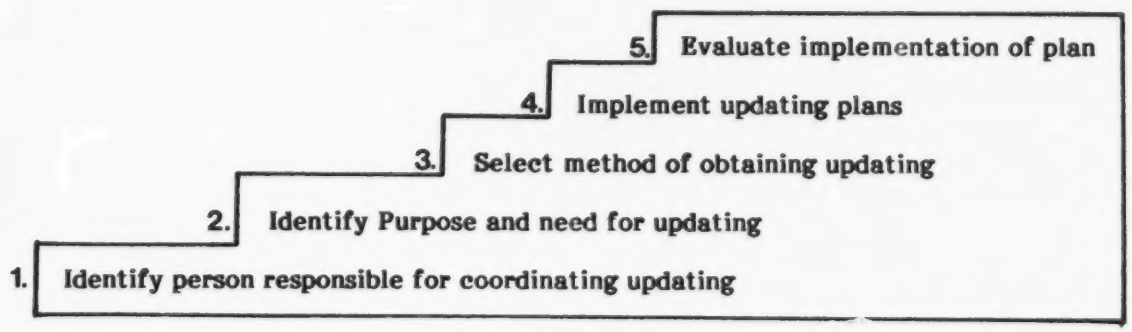
The final step in the process of technical skill updating is to evaluate the effectiveness of the effort. A formal plan for this evaluation should be implemented. The plan should address both the process and the product.

Formative (process) evaluation should occur as the program activities take place. For example, participants' reactions to activities could be gathered to

determine appropriateness of content and execution; or suggestions could be solicited on possible improvements to planned activities. This feedback should then be used to improve subsequent activities.

In addition, summative (product) evaluation should be conducted on the long-term effects of an updating program. Teachers' incorporation of new knowledge and skills into curricula should be monitored to ensure that it does occur. Follow-up activities would gather feedback from both employers and former students on the appropriateness of content (knowledge and skills) incorporated into program curricula, for example.

An important point to keep in mind is that evaluation, while considered the final step in an instructional program, never ends. The purpose of evaluation is to identify shortcomings in the program, improvements to rectify those shortcomings, and strengths of the program to be retained. These judgements then form the basis for further development of the program, thus starting the cycle again. Evaluation occurs in its natural place in this new cycle, resulting in another new cycle. Thus, each round of evaluation furnishes an additional set of data from which judgements are made about future developments.


5. Evaluate implementation of plan
4. Implement updating plans
3. Select method of obtaining updating
2. Identify Purpose and need for updating
1. Identify person responsible for coordinating updating

FIVE STEPS IN TECHNOLOGICAL UPDATING

TECHNOLOGICAL UPDATING DELIVERY TECHNIQUES

WORK EXPERIENCE INTERNSHIPS

One approach to updating technical skills of Trade and Industrial Education teachers is through work experience internships. Teachers actually return to work in businesses and industries to be brought up to date in their occupational area.

Proposed work experience for recertification purposes must be approved in advance by the Trade and Industrial Education Certification Consultant. The regulation states a teacher must be employed eight weeks for at least forty hours each week to qualify for three units of recertification credit. This work experience might extend over two summers and might be with different employers. Only three hours of recertification credit obtained through this method can be used in any five year valid certificate period.

ADMINISTRATIVE CHARACTERISTICS

The work experience internship has several typical characteristics:

- Teachers return to perform actual work in business or industry in their own fields.
- Specific objectives that teachers are to achieve are often determined in advance of their actual return to the work place. (A plan should be submitted for approval with these specific objectives outlined.)
- Businesses or industries to which teachers return are typically required to provide work experiences that will allow the achievement of the teachers' specified objectives.
- Teachers' progress and performance in the work experience internship are likely to be reported and evaluated. Reporting and evaluation are most often informal and may be performed by the participating teachers, a supervisor or administrator of the school or college, or a supervisor in the business or industry.
- Work experience in South Carolina requires eight weeks employment of forty hours each week to qualify for three units of recertification credit. However, to gain technical skill updating without any recertification credit, the internship can be of varying time spans.
- If internships are done during a regular school term, provision may be made so that teachers suffer no financial loss through participation in work experience internships. Some options--among others--that might be considered are suggested here. The school might continue the teachers' regular salary during the internship. (Such a continuation would usually carry a stipulation that the

teachers receive no salary or wages from the business or industry providing the experience.) Another possible arrangement might be for teachers to receive pay from business or industry but consign the pay to the school while remaining on regular teachers salary. Internships carried out on the teachers' own time (e.g., during holiday or summer vacations) do not affect their regular teaching salary.

- Sometimes teachers are given released time from teaching duties to participate in work experience internships. If so, the school might provide substitute teachers for the period of the internship. In exchange for released time, some institutions require a commitment from the teachers to return to teaching duties for a specified period of time after the internship. Some institutions, on the other hand, make no provisions for released time from teaching duties. Teachers participate in the internships on their own time.

- A program of work experience internships is usually implemented at the local level by the individual school or district.

ADVANTAGES AND DISADVANTAGES

There are both advantages and disadvantages to the use of work experience internships in providing technical skill updating for Trade and Industrial Education teachers. Among these are the quality and nature of instruction provided to teachers in the technology. The nature of instruction is potentially the greatest advantage, while the quality of instruction can, in individual cases, be a disadvantage.

The nature of instruction available to teachers in work experience internships is at least potentially of high quality. In an internship, the teacher has the opportunity to learn from the best possible source--those who work with and use the technology closely and daily. Workers and supervisors who are in constant and immediate contact with the technology are most likely to have the knowledge and skills that the teacher is seeking to acquire.

Furthermore, the instruction available in an internship can be intensive, sustained and comprehensive for the teacher. Released from the daily concerns of teaching duties and assigned to a regular work station in business or industry, the teacher has the opportunity to focus his or her entire attention on the task at hand. During a long internship, the teacher can acquire knowledge and skills in numerous areas of the technology--different pieces of equipment, different functions of the technology, different areas of technology, and so on. Finally, instruction can cover not only knowledge of the technology but also hands-on experience.

The quality of instruction provided in work experience internships might be problematic. Often supervisors and workers in business and industry offer high quality instruction. Many supervisors have had enough experience in training new workers to be quite effective in helping teachers acquire the knowledge and skills needed. The fact remains, however, that work experience internships might be rather loosely supervised and reviewed. No matter how well intentioned the participants, it

is possible that efficient and effective instruction will not be offered in a given internship. Business and industry personnel are, after all, not professional educators; there is always the chance that a teacher will not be taught in a way that allows him or her to learn effectively.

Another obvious disadvantage of work experience internships carried out during released time is the need to use substitute teachers. This is not meant as a reflection on the expertise of substitute teachers. However, students confronted with a change of teachers in the middle of a term must adjust themselves to the new individual and the individual's style of teaching and interacting. Such an adjustment is hardly likely to halt progress in the classroom and laboratory, but it does constitute a disruption in the routine of instruction and might slow progress temporarily. In high-technology areas, furthermore, adequate substitutes are often not available. Of course, internships done on the teachers' own time require no substitute teachers.

UNIVERSITY AND COLLEGE COURSE WORK

A commonly used approach for updating technical skills is through colleges. For example, a welding teacher may enroll in a welding course or a graphic communications teacher may enroll in a graphics course. Some of the Trade and Industrial Education areas do not have college courses available. Therefore, these areas have to be addressed in other ways.

School districts might work with colleges or universities to provide courses tailored to meet particular needs. One way that has been used by Clemson University and Winthrop College is to work with the Vocational Teacher Education Unit of the Office of Vocational Education to plan and offer a special content area course for several Trade and Industrial Education subject areas at the same time. Examples of these are: the Advanced Project Course offered at Irmo-Chapin Career Center in August, 1984 by Clemson University; and an especially designed content area course offered by Winthrop College and Clemson University at the Lancaster Area Vocational Center in June, 1985. These types of courses might carry college credit or they might be structured for recertification credit only--with appropriate, advanced approval.

ADMINISTRATIVE CHARACTERISTICS

A program of university or college course work for updating Trade and Industrial Education teachers characteristically functions in the following manner:

- Teachers enroll for selected undergraduate or graduate courses at a college or university that are an established part of the curriculum, or enroll in a special course for continuing education or certification credit.

- The process of selecting courses to be taken varies widely from one situation to the next. At one extreme, individual teachers select courses entirely on their own initiative and at their own convenience and expense to suit their own needs. At the other

extreme, teachers must justify the course selection to their school administrator by demonstrating its relevance to the program curriculum and its potential for improving instruction to prepare students for the world of work. Between these two extremes lie numerous variations in the extent to which this approach is regulated and monitored by educational authorities. If a teacher in South Carolina wants to be certain the course in which he/she plans to enroll will count toward the three hours recertification credit in content area, the course needs to be approved in writing by the Office of Vocational Education Teacher Certification Consultant prior to enrolling.

- Although teachers generally enroll for courses during non-teaching hours (i.e., evening hours or summer vacations), some vocational education institutions do provide released time from teaching duties for teachers to pursue course work. In its most extreme form, this released time is provided as sabbatical leave, usually reserved for long-term degree-oriented course work.

- Teachers' progress and performance in university or college course work are usually not closely supervised or monitored by the school district. When schools or colleges reimburse teachers for tuition expense, they generally require only proof of payment and successful course completion; success being typically defined in terms of letter grades. When university and college courses are non-reimbursed professional development activities, proof of successful course completion is usually the only requirement.

- The focus of course work from established courses listed in a college catalog is likely to be less well defined than that of other approaches to technological updating. As is often the case with courses at any level, teachers and administrators tend to think in terms of topical areas and very general learning objectives. A school district that requires teachers to pursue specific updating activities aimed at precise objectives might want to contract with colleges or universities for ad hoc special courses to meet needs.

ADVANTAGES AND DISADVANTAGES

There are potential disadvantages to university and college course work as an approach to updating technical skills of vocational teachers. One of these might be the level of expertise available among university and college faculty. A second is the appropriateness of this activity to teachers' specific updating needs. An advantage is the information resources available through the faculty.

While it is true that many individual university and college faculty members are in touch with the latest technological developments of their fields, some question remains as to whether universities and colleges are always the best source of current expertise for vocational teachers. Some university and college faculty members may be in the same situation as their secondary school colleagues. These faculty members have sometimes been away from the work place for as long as vocational teachers.

They may have had little or no opportunity to experience firsthand the effects of new technology on day-to-day work.

The appropriateness of university and college course work to teachers' specific updating needs is also sometimes questionable. University and college campuses often have the same financial limitations as secondary school vocational education institutions; as a result, the physical plant (e.g., tools, machinery, equipment) may be no more up to date than that of the vocational teacher's home institution. While this would not prevent teachers from acquiring knowledge of new technology, it would prevent acquiring hands-on experience in the operation of that technology. Appropriateness, then, would depend on the individual vocational teacher's own need for updating. Those seeking knowledge of new technology might do well to enroll in university and college courses, while others in need of hands-on experience might be inadequately served by the approach.

Another problem might arise in relation to the appropriateness of university and college course work. Teachers' selection of courses and their progress and performance in them are sometimes not closely monitored. Because of this, teachers might enroll without closely defining their specific needs. The paperwork for fee reimbursement, for example, may only require teachers to list a course title as a check of appropriateness of content. This invites teachers to think in broad, general, topical terms and not in terms of specific, task-oriented objectives that will increase their ability to prepare students for the actual tasks to be performed in the world of work. Because of the administrative characteristics of this approach, there is simply less likelihood that the particular activity chosen will result in vocational teachers' acquiring the exact technical knowledge and skills they need to make instruction current.

An advantage of utilizing colleges and universities in updating technical skills of Trade and Industrial teachers is the great potential for university and college faculty to act as information brokers. While their own personal expertise may not be sufficient to meet individual teachers' updating needs, the very nature of the faculty members' role in the educational community often equips them admirably as linking agents between those who need current expertise and sources of that expertise. They should be able, with the entire resources of the university or college at their disposal, to tell vocational teachers how to go about updating their knowledge and skills. Faculty members can very often put teachers in touch with the standard information resources of the educational community and the technology of their own area. Further, they are frequently able to identify personal contacts in the local business, industry, or education community who can share the latest technological knowledge and skills with vocational teachers. This role of resource broker is perhaps the most important one to be played by university and college faculty in technological updating efforts.

WORKSHOPS, CONFERENCES, AND SEMINARS

Workshops, conferences, and seminars are popular and used enthusiastically for staff development in many business, industry, and educational settings. Vocational educators share in this enthusiasm, which results in the frequent use of workshops, conferences, and seminars as a means of providing technological updating for vocational teachers. Examples of these types of staff development programs are the

Annual Vocational Conference sponsored by the South Carolina Office of Vocational Education, the special workshops offered through the Trade and Industrial Education Program Unit of the Office of Vocational Education each summer (i.e., the Auto Body Workshop, the Electrical Workshop, and so on), and local programs in school districts.

ADMINISTRATIVE CHARACTERISTICS

There can be great variation in the way individual schools, colleges,and districts implement programs of workshops, seminars, and conferences as a means of updating technical skills. However, the following general characteristics are typically discernable:

- Teachers attend relatively short training sessions targeted specifically to content and to audience (e.g., a workshop on electronic ignitions for automotive instructors). The length of these training sessions varies from one day to one week. Longer workshops do occur but are relatively uncommon.

- Subject matter experts are typically used as instructors in workshops. Very often, current workers or supervisors in business or industry are brought in as consultants. Given the source of expertise tapped in this approach, the instruction provided is usually perceived as quite up-to-date and pertinent to the participants' needs.

- Although many workshop activities are informational in nature, giving teachers up-to-date knowledge of technology, there is often considerable emphasis on hands-on activities and development of specific technological skills. In many instances, actual items associated with the technology (tools, machinery, equipment, and so on) are made available for skill development. Thus, in spite of the limitations imposed by the short duration of workshops, instruction can be thorough and intensive in the targeted content.

- In some cases, a comprehensive program of workshops is organized and offered by an educational agency--school, college, district, teacher education institution, State Department of Education, or professional organization. In these cases, the sponsoring agency generally conducts a needs assessment to determine the content to be covered. The extent of the needs assessment is dictated by the interests of the sponsoring agency: a State Department needs assessment usually includes all secondary vocational teachers in the state; a secondary school would restrict its assessment to its own teachers; and a professional organization would poll its entire membership, whether that be local, state or national.

- In other cases, no program of workshops exists. Teachers are simply urged to identify and attend workshops appropriate to their own needs and on their own initiative. This encouragement for workshop attendance may be formally and forcefully stated in, for example, a professional development policy. It may also be given

informally in casual personal interaction between administrators and teachers. Whether encouragement is formal or informal, however, careful needs assessment tends to be neglected in this approach. While many teachers are no doubt quite conscientious in selecting and attending appropriate workshops, there is often no mechanism for monitoring teachers' choices and ensuring that they will result in the specific improvement in instruction required to prepare students for the world of work.

- Provision is sometimes made for released time and reimbursement of expenses for workshop attendance. Such provision may be one component of a formally organized program of workshops. The ability of the institution to provide money and time for teachers to attend workshops depends on availability of funds.

- Workshops may be brought into a given vocational education institution, or teachers may travel to the workshops. When a comprehensive program of workshops is organized by an individual school, college, or district, the workshops are usually given on-site (or in a central location in the case of district programs). Workshop programs organized by teacher education institutions, the State Department of Education, or professional organizations are usually given at one or more central locations relatively accessible to all prospective participants in an effort to equalize the time and cost required to travel. Of course, there are no generalities to cover the location of workshops selected and attended by teachers on their own initiative.

It is helpful to differentiate workshops from one other approach to staff development--industry training or updating programs. Like workshops, industry programs are relatively short training sessions, typically targeted to specific content, and usually focusing on a product or products manufactured by the business or industry involved. Furthermore, the intended audience for industry programs is mainly business and industry personnel, not vocational educators. While many such training programs gladly accommodate vocational teachers, their primary concern is frequently the knowledge and skills of their own in-house staff.

ADVANTAGES AND DISADVANTAGES

There are advantages and disadvantages to using workshops, conferences, and seminars as a means of providing technological updating for Trade and Industrial Education teachers.

One significant advantage of workshops is the nature of instruction available to vocational teachers. Such instruction can be very specific in nature and oriented to the development of specific skill and knowledge. The specificity of the instruction offered has the advantage of focusing teachers' attention more closely on their own objectives. Thus, it is more likely that the activity will give teachers the opportunity to gain the knowledge and skills related to the latest technological developments in their fields.

A further advantage of workshops is that they typically tap one of the best possible sources of expertise--business and industry personnel involved in the daily application of technology. This helps to ensure that the instruction available in workshops reflects the actual practice and application of the technology in the specific field. Who could know better what knowledge and skills are required for the latest technological developments than someone who is involved with those developments every day? Use of vendors, who invest considerably in research and development of specific equipment for teaching high technology skills, might be considered, also.

There is sometimes a disadvantage to the use of workshops as an approach to updating the technical skills of Trade and Industrial Education teachers. The relatively small amount of time spent in a workshop means that only a relatively small amount of content can be covered. While this disadvantage can be minimized by implementing a comprehensive program of workshops, the fact remains that a single workshop may provide only partial coverage at best.

INDUSTRY OBSERVATION

Visiting and observing businesses and industries is an approach that has been used for updating the technical skills of teachers. Logically, one excellent way of finding out what changes are in a technological field is to go into the workplace and see it.

This approach has been implemented already in several school districts in South Carolina. These districts, being served by the following vocational centers, are: Daniel Morgan Vocational Center, Spartanburg; Lexington Area Vocational Center, Lexington; and Kershaw Area Vocational Center, Kershaw. Recertification credits for these types of updating have been granted through Clemson University and must meet the university's standards for awarding recertification credits. Other colleges or universities might offer a similar service.

ADMINISTRATIVE CHARACTERISTICS

This approach to updating the technical skills of vocational teachers commonly functions in the following manner:

- Teachers visit a business or industry site employing workers in the occupations for which they train students. At the site, teachers observe new technology in place and in operation. This allows teachers the opportunity to identify the knowledge and skills needed to prepare students for the technology of the world of work.

- Industry observations tend to be of short duration, from one to five days.

- The selection of sites to observe must be monitored closely and controlled by the administrator of staff development. Teachers largely use their own judgement, experience and knowledge of local

employers, often with input from advisory committee members, to identify appropriate sites to visit.

- Teachers may or may not be provided with released time for industry observations. Some districts are willing and able to pay for substitute instructors, allowing the visiting teacher to carry out the observation during normal teaching hours; others encourage teachers to observe on their own time--during evenings, weekends, or vacations. Reimbursement for travel also varies.

Industry observation differs from work experience internships in the length and nature of the experience. Observations are of shorter duration than internships and hence do not allow for the acquisition of as much content. Furthermore, observation--as the very name implies--provides participating instructors the opportunity only to acquire knowledge of new technology and its application and use in the work place. Typically, teachers do not go on to develop skill in using the technology themselves, as is the case in work experience internships.

ADVANTAGES AND DISADVANTAGES

There are advantages and disadvantages in using industry observations as a method for updating technical skills.

An advantage of industry observations is that they give teachers a firsthand look at technology in operation in the world of work. Teachers can acquire knowledge about technology and its use from the best possible source for their purpose--the actual business and industry sites where their students hope to be employed. (It would be difficult to overstate the importance of this factor to teachers seeking current technological knowledge and skills.)

On the other hand, while observation may provide teachers with knowledge of technology and its use, it does not provide the development of skills in the operation and use of the technology. This limitation may be acceptable to teachers who need only to teach their students about technology. It cannot, however, be acceptable to teachers whose students themselves need to develop up-to-date technical skills required in the world of work.

The possibility for relatively loose control of site selection for industry observation can be a disadvantage in the use of this approach. Many teachers will, of course, formulate their own specific goals and objectives for an observation and ensure that the site they select will allow them to meet these goals and objectives. However, others will tend to think in general and unspecific terms when selecting a site. Administrative checks are necessary to ensure that there is proper focus and that sites and practices are relevant to staff development needs. The process must be monitored closely. Instructors are typically required to write an evaluation of the job task observed.

EDUCATION AND INDUSTRY STAFF EXCHANGE

One means of updating the technical skills of vocational teachers is an

exchange of personnel between vocational education institutions and business or industry. The teachers involved have the opportunity to re-enter the workplace and gain current technical knowledge and skills; the business or industry personnel have the chance to teach a vocational course. All sides can benefit from such an exchange of staff.

ADMINISTRATIVE CHARACTERISTICS

- As implied in the name, the first characteristic of a staff exchange is the exchange of personnel between a school or college and a business or industry. The vocational teacher assumes the job position of the business or industry person, actually performing the functions and duties of that job, while that person takes over the teaching duties of the vocational teacher.

- Once the exchange of staff has been set up, each person involved actually does the work of the other. The teacher performs the functions and duties of the industry position he/she is filling. The industry person actually teaches in the program of the participating teacher.

- Each employer--the vocational education institution and the business or industry--undertakes the responsibility for providing the exchange personnel with the opportunity for meaningful involvement in its own operation. These undertakings are often expressed in formal written agreements between the two employers. One feature of such agreements is frequently a promise by the business or industry to allow the participating teacher access to production technology and a promise by the teacher to respect the confidentiality of such information. Also, such agreements usually address legal concerns associated with the exchange--licensure and safety issues, and liability insurance coverage, for example.

- Arrangements are generally made in each individual case for continuation of salary and benefits for the personnel involved in the exchange. The most common practice seems to be that each original employer continues to pay the regular salary and benefits of its own employee, provide worker's compensation coverage, and so on. Each employee officially remains an employee of the original employer, while being treated fully as an employee at the exchange site. Generally, the exchange between the two employers is one of services only.

- This exchange of personnel between vocational education and business or industry can last from two weeks to an entire academic quarter. In general, the length of a given exchange is fixed in the agreement between the two employers.

- Some vocational education institutions provide fairly close supervision and monitoring of the exchange experience for their teachers. Practice varies from one school to the next, but this

process can begin with an assessment of the teacher's specific need for updating and the development of stated objectives for the exchange experience. From that point, supervision may extend to visits to the exchange site by an administrator for periodic checks on progress and performance.

- Input is often sought from advisory committee members in identifying business and industry sites with which a staff exchange would be appropriate.

- Since the participating teacher is filling an actual job position at the exchange site, he/she has the opportunity to acquire both knowledge and skills in the technology and its applications. Exchange sites can be counted on to have the necessary physical plant and facilities, since they are engaged in work involving the technology in the first place.

The education and industry staff exchange shares common features with other forms of technological updating. Like work experience internships and part-time employment, it involves a return by teachers to the work place with the object of gaining experience in working with new technology. All three forms present teachers with the chance to acquire both knowledge and skills. In addition, staff exchanges and work experience internships are similar in that teachers are released from their regular teaching duties for the duration of the activity.

The feature that differentiates staff exchanges from other forms of technological updating is the exchange component. A vital part of the staff exchange is that the cooperating business or industry sends one of its employees to replace the teacher. In this respect, the staff exchange is an instance of truly collaborative relationship between vocational education and local business and industry.

ADVANTAGES AND DISADVANTAGES

Several advantages can be attributed to an education and industry staff exchange program for updating the technical skills of Trade and Industrial Education teachers. There are also several disadvantages.

As with other approaches to technological updating that involve return to the work place, the main advantage of staff exchanges is the nature of the instruction and expertise available to the teacher. The business or industry personnel from whom the teacher acquires technical knowledge and skills are in the best possible position to know the actual functioning of the work place. Furthermore, the business or industry site will naturally have in place the tools, machinery, and equipment that comprise the technological application. Hence, the activity is well suited to the needs of many vocational teachers.

An additional advantage of staff exchanges is that they can last long enough for the teacher to absorb a large amount of content in the technology. Even with a short-term exchange (e.g., two weeks), the experience is intensive enough to allow the teacher to become well grounded in knowledge and skills related to one segment of the technology.

There is also an advantage for the vocational program in staff exchanges. The industry person who temporarily assumes teaching duties may bring specialized technical knowledge and skills to the vocational classroom or laboratory. This knowledge and skill may permit the coverage of content not ordinarily included in the program curriculum, if appropriate. On the other hand, this advantage may be offset by the disadvantage that industry personnel have not usually had training and experience in vocational teaching. There is the further disadvantage that, regardless of the industry person's teaching skills, students must adjust to a disruption in instructional routine--a new teacher with a new style and a new approach.

The quality of instruction in technical knowledge and skills provided to the participating teacher can also be problematic. As noted previously, business and industry personnel are not generally educators; it is simply not their line of work. There is always the chance that a teacher will be unlucky in the assignment of personnel with whom he/she is to work at the exchange site.

PART-TIME EMPLOYMENT

Some vocational teachers assume teaching duties for only nine of the twelve months of the year. In addition, the nine-month academic year is punctuated by vacations of some length, (i.e., Christmas and Spring Break). For some teachers the teaching day is finished by three o'clock. Teaching duties might leave some Trade and Industrial Education teachers with time to devote to professional development purposes. One use to which this time can be put is part-time employment in business or industry. Such employment in the teacher's own technical field can provide the opportunity for technological updating.

ADMINISTRATIVE CHARACTERISTICS

As an approach to updating the technical skills of teachers, part-time employment usually works in the following manner:

- Teachers identify a business or industry in their own technical field, seek and obtain part-time employment with that employer.

- The part-time employment that teachers obtain takes place on non-teaching hours. This may be during the evening, on weekends, during vacations that occur within the academic year, or during the summer vacation of the nine-month year. Most common, however, is part-time employment during the summer vacation.

- The employment sought is a regular position with the business or industry. The participating teacher functions on the job just like any other part-time employee of the firm, with stated job tasks and responsibilities. Teachers receive pay as part-time employees according to company practice and policy.

- The work experience provided in part-time employment is not formally designed as an instructional experience. However, many teachers, in seeking this employment, reveal their motives and

purposes--that is, technological updating--to the business or industry involved, who then may cooperate with that intent by placing the teacher into an appropriate position. The fact remains that the teachers fill a standard job position, are responsible for the work of that position, and are paid for it. It is in this assumption of the normal role of employee that teachers find opportunity for updating their technical knowledge and skills.

- Depending on the nature of the specific position obtained, the teacher may have the occasion to develop both knowledge and skills related to current technology. In fact, it is more likely than not that the teacher will fill a position that involves both knowledge and skill in technological applications.

- Since part-time employment takes place during non-teaching hours and teachers are paid for their work, teachers are not usually recompensed for their time and effort by educational authorities. Released time is unnecessary; reimbursement for the usual occasional expenses of updating activities is generally not even offered. By and large, teachers participate in this form of updating activity on their own initiative.

- To be most effective there should be a plan with specific objectives to be reached related to instruction in the classroom.

Part-time employment differs from other approaches involving teachers' return to the work place. It differs from industry observation in the nature of the experience; teachers not only observe but also practice the technology in question in part-time employment. It differs from work experience internships in that the latter are specifically designed as instructional experiences, while part-time employment is only indirectly so; work experience internships also necessitate the provision of released time for the participating teacher and funds for substitute teachers. Furthermore, work experience internships are often a matter of formal written aggreement between the cooperating business or industry and the vocational education institution. Part-time employment, on the other hand, is most often entirely between the teacher and the business or industry involved.

ADVANTAGES AND DISADVANTAGES

Part-time employment, like all types of technological updating techniques, has both advantages and disadvantages.

The greatest advantage of part-time employment as an approach to updating technical skills is that the instruction provided comes from the best possible source of expertise--an actual business or industry site at which the technology is applied and used. Once again, the particular businesses or industries at which students might eventually be employed are the best places to find what knowledge and skills students will need and to gain the knowledge and skills.

Part-time employment also provides the opportunity for instruction in either knowledge or skills or both. The source of expertise is good and appropriate; the

nature of the site is such that physical plant and equipment are available for practicing the skills required in their use. Finally, the nature of the participating teacher's status at the training site--a regular worker in a regular job position--not only allows but actually requires that the teacher gain the knowledge and skills necessary to do the job.

One disadvantage of part-time employment as a means of skill updating is that the content of instruction is dictated by the job position that the teacher is able to obtain. The knowledge and skills that the teacher can acquire will be those used in the particular position. Furthermore, the loose administrative control of part-time employment lessens the likelihood that teachers will carefully and seriously assess their own updating needs. All in all, the appropriateness of the content of instruction in part-time employment can be problematic.

LOCAL PROGRAMS

Many efforts to provide updating of technical skills for Trade and Industrial Education teachers are undertaken in locally planned and operated programs. Such programs are put in place by individual schools or school districts.

Here in South Carolina many school districts have been providing staff development through approved staff development plans for several years. Some districts act alone and others have formed a consortium of several school districts to implement their staff development plans.

For example, the CYLUC-W Consortium consists of Winthrop College and Chester, Clover, Fort Mill, Lancaster, Rock Hill, Union and York School Districts. The CYLUC-W Consortium provides a staff development system that offers opportunities for teachers in member districts to attend the staff development activities offered through this consortium. This type of system to provide technological updating for Trade and Industrial Education teachers might be considered as a viable method for several school districts to join together in an effort to keep their Trade and Industrial Education teachers current in their occupational areas.

ADMINISTRATIVE CHARACTERISTICS

- In the case of local programs, the audience served is the teaching staff of the implementing school or district. Depending on the size of the teaching staff, the effort may be subdivided by program areas.

- The local education agency must generally provide its own resources for a program of technological updating activities. Funds for purchasing activities and time for administration of them and for teacher participation most often are earmarked in regular operating budgets. Occasionally, however, a given institution is able to procure special grant funds to operate a particular project to update its teachers. As one example, the Appalachian Regional

Council funded a return-to-industry program operated by a consortium of three South Carolina technical colleges for three years.

- The process of assessing teachers' specific needs for updating typically tends to be less formal and methodical than is the case in non-local programs. In many instances, teachers are asked to discover by introspection their own content updating needs as part of the formulation of an individual professional development plan. In other instances, teachers are simply required to identify specific objectives to be fulfilled by a particular activity they propose. In still other instances, teachers are not required to identify specific updating needs at all--administrators simply accept on faith the appropriateness of proposed activities to teachers' needs. It has been typically uncommon for a given school or district to survey the updating needs of its entire teaching staff.

- The kinds of activities that teachers choose within local programs of technological update are numerous and varied.

- The process of identifying and selecting appropriate updating activities should be formal and methodical. Knowledge of such activities often depends on promotional efforts by the agency or the employer sponsoring the activity.

- Incentives are often provided for teacher participation in updating activities. Professional development policies commonly assign relative values to different kinds of activities, with teachers being required to accumulate a specified total value of such activities. Recertification policies often do the same. Reimbursement for direct and indirect expenses involved in teacher participation in updating activities is almost universally allowed; some institutions also allow for substitute teachers, permitting released time for teacher participation.

- One frequently cited means of allowing teachers the time to participate in updating activities is leave from duty--professional leave, sabbatical leave, and so forth.

- Feedback on the effectiveness and appropriateness of individual updating activities has been less common in local programs because of the fragmented nature of the program as a whole. This is the case especially when individual teachers identify their own activities and participate in them as individuals. When an activity is brought into the school or district for a large number of teachers, or when teachers attend an out-of-school activity en masse, the likelihood is increased that feedback on the activity will be obtained.

The distinctive feature of local programs for updating technical skills is, very simply, the locus of administrative control. Local programs are generally planned and carried out by administrators at the individual school or district. Input and

involvement is often sought from teachers as well. The important point, is that the primary impetus and support for local program efforts should come from those immediately concerned--the individual teachers and administrators of the schools and districts.

ADVANTAGES AND DISADVANTAGES

When considering local programs for updating technical skills of Trade and Industrial Education teachers, the advantages and disadvantages should be examined carefully.

One advantage of local programs for updating technical skills is that they can be very closely suited to the needs of individual teachers. Since very often individual teachers are responsible for identifying and selecting their own updating activities within stated guidelines, they are usually free to pursue their own purposes in selecting specific updating events. On the other hand, the typical informal nature of the needs assessment process in local programs can result in teachers' selecting and participating in activities without having clearly in mind their own needs for specific knowledge and skills.

A distinct advantage of local programs for updating skills is that they are more likely to give teachers the chance to acquire new technical knowledge and skills in their own best way. Since teachers are often free to choose their own activities, they can select activities involving delivery techniques most appropriate to their own learning styles. However, the variety of options available in theory may be limited in practice by the availability of resources, facilities, and expertise in the local community.

NON-LOCAL PROGRAMS

Many programs for updating technical skills are organized and presented by agencies other than individual schools or districts. Such programs can be carried out under the auspices of the State Department of Education, universities or other teacher education institutions, or professional organizations.

ADMINISTRATIVE CHARACTERISTICS

- The intended audience for such programs is the constituency served by the sponsoring agency. In the case of the State Department of Education, it would most likely be teachers in the state. A teacher education institution would aim to serve teachers in the geographic area from which it normally draws enrollments. A professional organization would target its activities to its members.

- The sponsoring agency uses its own resources, at least in part, in funding the programs. The State Department of Education sometimes has at its disposal state or federal funds, perhaps specifically earmarked for professional development purposes. Universities or teacher education institutions have their normal

operating budgets and often charge regular tuition and course fees to participating instructors. Professional organizations have their treasuries to draw on and may charge activity fees as well.

- The content of such programs is generally determined by a needs assessment carried out by the sponsoring agency, covering the entire constituency of that agency. As a result, the content of activities is usually governed by the needs of the majority and may or may not meet the needs of any single given teacher. In other words, the population of automotive teachers of an entire state may have, as its greatest need, updating in electronic ignitions. Yet an activity on electronic ignitions would not meet the needs of any teacher who possessed current knowledge and skills in that particular area but was out of date in catalytic converters.

- Programs usually provide some incentive for teacher participation. State Department-sponsored programs are usually operated at no cost to participants. Professional development or recertification credit is often extended for participation, as well. University-sponsored programs sometimes require that participants pay tuition and course fees; this is offset, however, by the regular course credits received by participants. Furthermore, these course credits often have further indirect benefit to participants because they can be used to fulfill professional development or recertification requirements.

- Since events in this type of updating are often repeated, some attempt is usually made to evaluate their effectiveness. Participants are often given short, informal instruments on which to rate the appropriateness of content and effectiveness of delivery. This feedback can then be used in planning for the next event.

Almost any kind of delivery technique can be used in a program of activities sponsored by these non-local agencies. The differentiating feature is the locus of administrative control. The programs under discussion here are not planned and implemented by local educational authorities. In many instances, local teachers and administrators are involved in planning and implementation, but the primary impetus and support come from others with more wide-ranging responsibilities.

ADVANTAGES AND DISADVANTAGES

Definite advantages and disadvantages are associated with non-local programs just as in the other types of skill updating techniques.

One advantage of programs offered by non-local agencies is that they are more likely to involve a greater number of teachers than any given technique implemented by a single school or district. The formal needs assessment process that is likely to accompany such a program helps to ensure the appropriateness of updating

events to the needs of the whole population of teachers. The evaluation component aids in either confirming the appropriateness of content and effectiveness of instruction or providing the basis for modification.

A disadvantage of such programs is that any single event may not be appropriate to the needs of a given teacher. Since content is determined by the results of needs assessment, the majority, naturally enough, tends to rule in this process. Unless the sponsoring agency has unlimited funds at its disposal--unlikely in this day and age--teachers who do not fit the majority pattern may not be able to benefit from a program catering to the wider constituency.

On the other hand, the size of the potential target audience increases the likelihood that a large enough number of teachers will express a particular content need that an event to address it will be justified. Although a single teacher with a more esoteric updating need may have difficulty arranging an appropriate activity, a statewide survey may identify enough teachers with the same need to justify the inclusion of an appropriate activity in an overall program.

Other advantages or disadvantages of a given program would arise from the particular form of the activities offered. Each of the delivery techniques that could be used has its own set of strengths and weaknesses. These would of course be present in a program sponsored by any of the non-local agencies concerned.

INDUSTRY TRAINING AND UPDATING PROGRAMS

In some instances Trade and Industrial Education teachers are able to obtain needed updating of their technical knowledge and skills through training events presented by business and industry. Although not always available to all teachers in all occupational specialities, this form of updating is often considered to be of great value.

ADMINISTRATIVE CHARACTERISTICS

The following are typical characteristics of business and industry training and updating programs:

- Industry training and updating programs most often take the form of workshops, conferences, and seminars. Such events are offered by a business or industry in order to train its own personnel in new technology related to products or services.

- Secondary school Trade and Industrial Education teachers are often invited to participate in industry training events. Teacher participation helps to ensure that program graduates will have the specific technological knowledge and skills needed by potential employees of the business or industry.

- Many industry training events are offered to Trade and Industrial Education teachers at no charge.

- The content of industry training and updating programs is based on the perceptions of the sponsoring industry's own needs. Hence, content is specific to the products, services, and concerns of the sponsor. As such, content often includes both knowledge of technology and skills required by the technology.

- Industry typically uses its own in-house training personnel as instructors in training and updating programs, and programs are generally presented at industry sites.

- Trade and Industrial Education teachers may be provided with released time for participation in industry training and updating programs. They may, in addition, be reimbursed for travel expenses and fees for participating in the program. Reimbursement and provisions of released time depend for the most part on availability of funds.

The feature that differentiates industry training and updating programs from other programs of workshops, conferences, and seminars is sponsorship and its effect on content. Industry-based programs are organized and presented by industry in response to its own felt needs, which include vocational education only indirectly. Vocational instructors often participate in industry-based programs because the needs of industry and those of vocational education largely coincide. The same explanation applies to the more specifically targeted content of industry training programs.

ADVANTAGES AND DISADVANTAGES

There are many advantages to using industry training programs as a system for Trade and Industrial Education teachers to keep their technical skills current. However, there is a disadvantage that should be taken into account when using this technique.

A major advantage of industry training as a means of technological updating is that it taps what is probably the best possible source of expertise. The industry personnel that provide instruction in such programs are in a position to be fully aware of specific technology and the skills required in its application. In addition, the industry sites at which training is usually offered have the advantage of having available the particular equipment and physical facilities related to training content.

The specificity of content in most industry training programs has a further advantage. It makes it more likely that teachers will choose to participate in response to specific needs of their own. The more specific the content of the program, the greater the guarantee that it will be chosen as an updating activity.

One more advantage in industry training is the inclusion of both knowledge and skill acquisition in instruction. The specificity of content, the high level of teaching expertise, and the availability of physical equipment allow both information and practice to be included in instruction.

A disadvantage in the nature of instruction provided in industry training is quantity. The short-term nature of the events dictates that only a limited amount of

content can be covered if it is to be covered in depth. Hence, a training event may be quite appropriate for the content it covers but insufficient for teachers' overall need for updating.

TECHNICAL SKILL UPDATING DELIVERY TECHNIQUES